

# 2009 Annual Drinking Water Quality Report

**Public Water System Name: USAF-Luke**  
**Public Water System Number: AZ04 -07-305**

This is an annual report on the quality of drinking water delivered by Luke Air Force Base. Under the "Consumer Confidence Reporting Rule" of the Federal Safe Drinking Water Act (SDWA), community water systems are required to report this water quality information to the consuming public. This report presents information on the source of our water, its constituents and the health risks associated with any contaminants. It also contains extensive technical language required by the Environmental Protection Agency (EPA), which is designed to further public understanding about public water systems and potential hazards across the country.

## General Information About Drinking Water

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV-AIDS or other immune system disorders, some elderly, and infants can be particularly at risk of infections. These people should seek advice about drinking water from their healthcare providers. For more information about contaminants and potential health effects, or to receive a copy of the U.S. Environmental Protection Agency (EPA) and the U.S. Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and microbiological contaminants call the EPA Safe Drinking Water Hotline at 1-800-426-4791.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides** that may come from a variety

of sources, such as agriculture, urban stormwater runoff, and residential uses.

- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and also may come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants**, that can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Arizona Department of Environmental Quality prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water.

## Our Water Source(s)

Luke Air Force Base's drinking water is groundwater supplied through various wells that pump from the West Salt River Valley sub-basin within the Phoenix Active Management Area defined by the Arizona Department of Water Resources. The water from these on-base wells is treated with chlorine as a disinfectant at the well head, mixed within the distribution system, stored in two above ground tanks on base, and distributed throughout the base and base housing. In addition, Luke AFB has one location that provides purified water that has been through an extra filtration process called reverse osmosis. This filtration removes contaminants that may affect taste and other aesthetics. Taps that supply this water are located at the building beneath the water tower near the intersection of Bong Lane and Mitchell Street.

Source Water Assessments on file with the Arizona Department of Environmental Quality are available for public review. If a Source Water Assessment is available, you may obtain a copy of it by contacting the Arizona Source Water Coordinator at (602) 771-4641.

The Source Water Assessment Report provides a screening-level evaluation of potential contamination that could occur. It does not mean that the contamination has or will occur. We can use this information to evaluate the need to improve our current water treatment capabilities and prepare for future contamination threats. This can help us ensure that quality finished water is delivered to your homes. In addition, the source water assessment results provide a starting point for developing a source water protection plan.

Luke AFB's drinking water is managed by two base agencies. Civil Engineering (56 CES/CEOI) manages the maintenance and operations of the drinking water supply and distribution system. Bioenvironmental Engineering (BE) (56 AMDS/SGPB) monitors the quality of the drinking water provided to consumers and addresses any related health concerns.

### Terms and Abbreviations

To help you understand the terms and abbreviations used in this report, we have provided the following definitions:

- **Parts per million (ppm) or Milligrams per liter (mg/L)** - one part per million corresponds to one minute in two years or a single penny in \$10,000.
- **Parts per billion (ppb) or Micrograms per liter (µg/L)** - one part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.
- **Parts per trillion (ppt) or Nanograms per liter (nanograms/L)** - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.
- **Parts per quadrillion (ppq) or Picograms per liter (picograms/L)** - one part per quadrillion corresponds to one minute in 2,000,000,000 years or one penny in \$10,000,000,000,000.
- **Picocuries per liter (pCi/L)** - picocuries per liter is a measure of the radioactivity in water.
- **Action Level (AL)** - the concentration of a contaminant which, if exceeded, triggers treatment or other

requirements which a water system must follow.

- **Action Level Goal (ALG)** - The "Goal" is the level of a contaminant in drinking water below which there is no known or expected risk to health. The ALG allows for a margin of safety.
- **Maximum Contaminant Level Goal (MCLG)** - The "Goal" is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **Maximum Contaminant Level (MCL)** - The "Maximum Allowed" is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- **Maximum Residual Disinfectant Level Goal (MRDLG)**: The level of a drinking water disinfectant, below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- **Maximum Residual Disinfectant Level (MRDL)**: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **Running Annual Average (RAA)**: An average of monitoring results for the previous 12 calendar months.

### Water Quality Data

We routinely monitor for contaminants in your drinking water according to Federal and State laws. The State of Arizona requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. Some of our data, though representative, may be more than one year old. All sample locations are determined by the State EPA. Lead, copper, disinfectant and disinfection byproducts, and bacterial samples are sampled at the point of consumption. All other samples are taken at entry points to the water distribution system.

These tables show the detected results of our monitoring for the period of January 1 to December 31, 2009 unless otherwise noted.

#### Microbiological Contaminants

| Contaminant  | MCL   | MCLG | Unit              | Result | Violation (Yes or No) | Sample Date | Likely Source of Contamination       |
|--|---|------|-------------------|--------|-----------------------|-------------|--------------------------------------|
| Total Coliform Bacteria for Systems that collect <40 samples per month | No more than 1 positive monthly sample  | 0    | Absent or Present | Absent | No                    | 10/month    | Naturally present in the environment |
| Fecal coliform and E. Coli   | A routine sample & a repeat sample are total coliform positive, & one is also fecal coliform or <i>E. coli</i> positive | 0    | Absent or Present | Absent | No                    | 10/month    | Human and animal fecal waste         |

### Radionuclides

| Contaminant         | MCL | MCLG | Units | Level Detected & Range | Violation (Yes or No) | Sample Date                          | Likely Source of Contamination         |
|---------------------|-----|------|-------|------------------------|-----------------------|--------------------------------------|--|
| Alpha emitters      | 15  | 0    | pCi/l | 1.0-5.3                | No                    | Mar 09<br>Jun 09<br>Sep 09<br>Dec 09 | Erosion of natural deposits            |
| Gross Beta emitters | 4   | 0    | mrem  | < 4                    | No                    | Mar 09<br>Jun 09<br>Sep 09<br>Dec 09 | Decay of natural and man-made deposits |
| Combined radium     | 5   | 0    | pCi/l | <0.3                   | No                    | Mar 09<br>Jun 09<br>Sep 09<br>Dec 09 | Erosion of natural deposits            |
| Uranium             | 30  | 0    | ppb   | 1.5-6.8                | No                    | Mar 09<br>Jun 09<br>Sep 09<br>Dec 09 | Erosion of natural deposits            |

### Lead and Copper

| Contaminant | AL  | ALG | Units | 90 <sup>th</sup> Percentile | Number of Sites over AL | Violation (Yes or No) | Sample Date/Year | Likely Source of Contamination   |
|-------------|-----|-----|-------|-----------------------------|-------------------------|-----------------------|------------------|--|
| Copper      | 1.3 | 1.3 | ppm   | 0.24                        | 0                       | No                    | Aug 07           | Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| Lead        | 15  | 0   | ppb   | 6.3                         | 0                       | No                    | Aug 07           | Corrosion of household plumbing systems, erosion of natural deposits                                   |

### Disinfectants

|          | MRDL | MRDLG | Units | Level Detected & Range | Violation (Yes or No) | Sample Date/Year | Source                                  |
|----------|------|-------|-------|------------------------|-----------------------|------------------|---|
| Chlorine | 4    | 4     | ppm   | 0.06-1.6               | No                    | RAA              | Water additive used to control microbes |

### Disinfection Byproducts

| Contaminant                  | MCL | MCLG | Units | Average | Range    | Highest RAA | Violation (Yes or No) | Sample Date/Year | Likely Source of Contamination            |
|------------------------------|-----|------|-------|---------|----------|-------------|-----------------------|------------------|---|
| Haloacetic Acids (HAA)       | 60  | N/A  | ppb   | 0.38    | ND-2.2   | N/A         | No                    | Jun 09           | By-product of drinking water disinfection |
| Total Trihalomethanes (TTHM) | 80  | N/A  | ppb   | 8.8     | 6.2-12.5 | N/A         | No                    | Jun 09           | By-product of drinking water disinfection |

### Inorganic Contaminants

| Contaminant | MCL | MCLG | Units | Level Detected/ Range | Violation (Yes or No) | Sample Date                          | Likely Source of Contamination   |
|-------------|-----|------|-------|-----------------------|-----------------------|--------------------------------------|--|
| Antimony    | 6   | 6    | ppb   | <3                    | No                    | Jan 07                               | Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder                                      |
| Arsenic     | 10  | 0    | ppb   | 2.8-17.9              | Yes                   | Jan 09<br>Jun 09<br>Sep 09<br>Dec 09 | Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes                   |
| Asbestos    | 7   | 7    | MFL   | <0.2                  | No                    | Sep 07                               | Decay of asbestos cement water mains; erosion of natural deposits  |
| Barium      | 2   | 2    | ppm   | 0.037-0.15            | No                    | Jan 07                               | Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits                               |
| Beryllium   | 4   | 4    | ppb   | <1                    | No                    | Jan 07                               | Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries |

| Contaminant           | MCL | MCLG | Units | Level Detected/<br>Range | Violation<br>(Yes or No) | Sample Date | Likely Source of Contamination  |
|-----------------------|-----|------|-------|--------------------------|--------------------------|-------------|---|
| Cadmium               | 5   | 5    | ppb   | <1                       | No                       | Jan 07      | Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints |
| Chromium              | 100 | 100  | ppb   | 6.3-21                   | No                       | Jan 07      | Discharge from steel and pulp mills; erosion of natural deposits  |
| Cyanide               | 200 | 200  | ppb   | < 8                      | No                       | Jan 07      | Discharge from steel/metal factories; discharge from plastic and fertilizer factories   |
| Fluoride              | 4   | 4    | ppm   | 0.59 – 2.0               | No                       | Jan 07      | Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories           |
| Mercury (inorganic)   | 2   | 2    | ppb   | <0.2                     | No                       | Jan 07      | Erosion of natural deposits; discharge from refineries and factories; runoff from landfills; runoff from cropland                   |
| Nitrate (as Nitrogen) | 10  | 10   | ppm   | 7.17                     | No                       | Jan 09      | Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits   |
| Nitrite (as Nitrogen) | 1   | 1    | ppm   | <0.2                     | No                       | Jan 09      | Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits   |
| Selenium              | 50  | 50   | ppb   | <1                       | No                       | Jan 07      | Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines                                    |
| Thallium              | 2   | 0.5  | ppb   | <1                       | No                       | Jan 07      | Leaching from ore-processing sites; discharge from electronics, glass, and drug factories   |

### Synthetic Organic Contaminants, Including Pesticides and Herbicides

| Contaminant                      | MCL | MCLG | Units | Level Detected/<br>Range   | Violation<br>(Yes or No) | Sample Date | Likely Source of Contamination  |
|----------------------------------|-----|------|-------|----------------------------|--------------------------|-------------|---|
| 2,4-D                            | 70  | 70   | ppb   | <0.1                       | No                       | Sep 07      | Runoff from herbicide used on row crops   |
| 2,4,5-TP (Silvex)                | 50  | 50   | ppb   | <0.2                       | No                       | Sep 07      | Residue of banned herbicide   |
| Alachlor                         | 2   | 0    | ppb   | <0.2                       | No                       | Sep 07      | Runoff from herbicide used on row crops   |
| Atrazine                         | 3   | 3    | ppb   | <0.1                       | No                       | Sep 07      | Runoff from herbicide used on row crops   |
| Benzo (a) pyrene (PAH)           | 200 | 0    | ppt   | <20                        | No                       | Sep 07      | Leaching from linings of water storage tanks and distribution lines                       |
| Carbofuran                       | 40  | 40   | ppb   | <0.9                       | No                       | Sep 07      | Leaching of soil fumigant used on rice and alfalfa  |
| Chlordane                        | 2   | 0    | ppb   | <0.2                       | No                       | Sep 07      | Residue of banned termiticide   |
| Dalapon                          | 200 | 200  | ppb   | <1                         | No                       | Sep 07      | Runoff from herbicide used on rights of way   |
| Di (2-ethylhexyl) adipate        | 400 | 400  | ppb   | <0.6                       | No                       | Sep 07      | Discharge from chemical factories   |
| Di (2-ethylhexyl) phthalate      | 6   | 0    | ppb   | <0.6                       | No                       | Sep 07      | Discharge from rubber and chemical factories  |
| Dibromochloropropane             | 200 | 0    | ppt   | <20                        | No                       | Sep 07      | Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards     |
| Dinoseb                          | 7   | 7    | ppb   | <0.2                       | No                       | Sep 07      | Runoff from herbicide used on soybeans and vegetables                                     |
| Diquat                           | 20  | 20   | ppb   | <0.4                       | No                       | Sep 07      | Runoff from herbicide use   |
| Dioxin [2,3,7,8-TCDD]            | 30  | 0    | ppq   | <5                         | No                       | Sep 07      | Emissions from waste incineration and other combustion; discharge from chemical factories |
| Endothall                        | 100 | 100  | ppb   | <9                         | No                       | Sep 07      | Runoff from herbicide use   |
| Endrin                           | 2   | 2    | ppb   | <0.01                      | No                       | Sep 07      | Residue of banned insecticide   |
| Ethylene dibromide               | 50  | 0    | ppt   | <10                        | No                       | Sep 07      | Discharge from petroleum refineries   |
| Glyphosate                       | 700 | 700  | ppb   | <6                         | No                       | Sep 07      | Runoff from herbicide use   |
| Heptachlor                       | 400 | 0    | ppt   | <40                        | No                       | Sep 07      | Residue of banned temiticide  |
| Heptachlor epoxide               | 200 | 0    | ppt   | <20                        | No                       | Sep 07      | Breakdown of heptachlor   |
| Hexachlorobenzene                | 1   | 0    | ppb   | <0.1                       | No                       | Sep 07      | Discharge from metal refineries and agricultural chemical factories                       |
| Hexachlorocyclo pentadiene       | 50  | 50   | ppb   | <0.1                       | No                       | Sep 07      | Discharge from chemical factories   |
| Lindane                          | 200 | 200  | ppt   | <20                        | No                       | Sep 07      | Runoff/leaching from insecticide used on cattle, lumber, gardens                          |
| Methoxychlor                     | 40  | 40   | ppb   | <0.1                       | No                       | Sep 07      | Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock           |
| Oxamyl [Vydate]                  | 200 | 200  | ppb   | <2                         | No                       | Sep 07      | Runoff/leaching from insecticide used on apples, potatoes and tomatoes                    |
| PCBs [Polychlorinated biphenyls] | 500 | 0    | ppt   | All below screening levels | No                       | Sep 07      | Runoff from landfills; discharge of waste chemicals                                       |
| Pentachlorophenol                | 1   | 0    | ppb   | <0.04                      | No                       | Sep 07      | Discharge from wood preserving factories  |
| Picloram                         | 500 | 500  | ppb   | <0.1                       | No                       | Sep 07      | Herbicide runoff  |
| Simazine                         | 4   | 4    | ppb   | <0.07                      | No                       | Sep 07      | Herbicide runoff  |

| Contaminant | MCL | MCLG | Units | Level Detected/Range | Violation (Yes or No) | Sample Date | Likely Source of Contamination                             |
|-------------|-----|------|-------|----------------------|-----------------------|-------------|--|
| Toxaphene   | 3   | 0    | ppb   | <1                   | No                    | Sep 07      | Runoff/leaching from insecticide used on cotton and cattle |

### Volatile Organic Contaminants

| Contaminant                | MCL | MCLG | Units | Level Detected/Range | Violation (Yes or No) | Sample Date | Likely Source of Contamination  |
|----------------------------|-----|------|-------|----------------------|-----------------------|-------------|---|
| Benzene                    | 5   | 0    | ppb   | < 0.5                | No                    | Mar 09      | Discharge from factories; leaching from gas storage tanks and landfills |
| Carbon tetrachloride       | 5   | 0    | ppb   | <0.5                 | No                    | Mar 09      | Discharge from chemical plants and other industrial activities          |
| Chlorobenzene              | 100 | 100  | ppb   | <0.5                 | No                    | Mar 09      | Discharge from chemical and agricultural chemical factories             |
| o-Dichlorobenzene          | 600 | 600  | ppb   | < 0.5                | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| p-Dichlorobenzene          | 75  | 75   | ppb   | <0.5                 | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| 1,2-Dichloroethane         | 5   | 0    | ppb   | <0.5                 | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| 1,1-Dichloroethylene       | 7   | 7    | ppb   | < 0.5                | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| cis-1,2-Dichloroethylene   | 70  | 70   | ppb   | <0.5                 | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| trans-1,2-Dichloroethylene | 100 | 100  | ppb   | <0.5                 | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| Dichloromethane            | 5   | 0    | ppb   | < 0.5                | No                    | Mar 09      | Discharge from pharmaceutical and chemical factories                    |
| 1,2-Dichloropropane        | 5   | 0    | ppb   | <0.5                 | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| Ethylbenzene               | 700 | 700  | ppb   | 2.5                  | No                    | Mar 09      | Discharge from petroleum refineries                                     |
| Styrene                    | 100 | 100  | ppb   | < 0.5                | No                    | Mar 09      | Discharge from rubber and plastic factories; leaching from landfills    |
| Tetrachloroethylene        | 5   | 0    | ppb   | <0.5                 | No                    | Mar 09      | Discharge from factories and dry cleaners                               |
| 1,2,4-Trichlorobenzene     | 70  | 70   | ppb   | <0.5                 | No                    | Mar 09      | Discharge from textile-finishing factories                              |
| 1,1,1-Trichloroethane      | 200 | 200  | ppb   | < 0.5                | No                    | Mar 09      | Discharge from metal degreasing sites and other factories               |
| 1,1,2-Trichloroethane      | 5   | 3    | ppb   | <0.5                 | No                    | Mar 09      | Discharge from industrial chemical factories                            |
| Trichloroethylene          | 5   | 0    | ppb   | < 0.5                | No                    | Mar 09      | Discharge from metal degreasing sites and other factories               |
| Toluene                    | 1   | 1    | ppm   | <0.0005              | No                    | Mar 09      | Discharge from petroleum factories                                      |
| Vinyl Chloride             | 2   | 0    | ppb   | <0.5                 | No                    | Mar 09      | Leaching from PVC piping; discharge from chemical factories             |
| Xylenes                    | 10  | 10   | ppb   | 4                    | No                    | Mar 09      | Discharge from petroleum factories; discharge from chemical factories   |

### Violations

The following violations were received by our water system or were ongoing in the calendar year 2009

| Type/Description                      | Compliance Period |
|---------------------------------------|-------------------|
| Maximum Contaminant Level for Arsenic | 1st Quarter       |
| Missed monitoring for Nitrate         | 4th Quarter       |

Luke AFB published Public Notices for the above listed violations in the base newspaper, the *Thunderbolt*. For additional information on the cause of these violations and their resolution, please contact Bioenvironmental Engineering at (623) 856 -7521. Other missed monitoring events occurred due to out-of-service wells at Luke AFB.

### Health Effects Information About the Above Tables

Some people who drink water containing **arsenic** in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. Arsenic in Luke's groundwater occurs naturally due to the salt deposits beneath the surface, and is frequently seen at similar levels across the southwestern desert. During the 1<sup>st</sup> quarter, levels slightly exceeded the new EPA standard for arsenic. In order to meet this new standard, two large projects have been implemented. A \$1.25 million arsenic treatment plant began operation in March 2009 and is producing water that meets EPA standards. Additionally, a \$1.3 million blended water main that will blend water from two wells with water from a third well, which has no detectable arsenic, is fully constructed and operational. **Since the implementation of the new arsenic treatment program, quarterly analysis indicates levels below accepted standards following 1<sup>st</sup> quarter 2009.**